

any sort, but for its revelation of the matchless mountain and marine scenery of Greece, Sicily, and the Adriatic coast, for its breaths of an intoxicating air, and for the side-lights it throws on Greek peasant interiors and a rural life, which few foreigners have seen as often, and known as intimately, as our author. He shows himself typically American, restless, strenuous, adventurous, claiming the right to go everywhere and do everything, within the physical capacity of a man, but at the same time in singular sympathy with a land and people so little like his own. The book is very pleasant reading for all who know Greece, and should serve to excite many, who do not, to visit one of the loveliest lands on earth.

D. G. H.

### OUR BOOK SHELF.

*Ueber verschiedene Wege phylogenetischer Entwicklung.* By Prof. O. Jaekel, Berlin. Pp. 60; 28 figures. (Jena: Gustav Fischer, 1902.) Price 1.50 marks.

THERE are three dominant ideas in this notable essay, each requiring for the exposition it merits more space than our limits admit of.

(1) Besides the gradual changes with which we are all familiar, there have been what Galton called "transilient" transformations ("saltatory variations," "sprungweise Umbildungen"). By individual variation within one generation or within a few generations, certain animal organisms have undergone profound transformations, comparable to the "mutations" described in plants by Korschinsky and de Vries. This is an important conclusion, the evidence for which is palæontological. Prof. Jaekel distinguishes what may be called three grades of variation:—(a) the so-called normal range of variation, changes in the proportions and correlations of the structural architecture, limited in final result by the conditions of inter-crossing; (b) abrupt deviations which transcend the limits of structural correlation and cannot be harmonised with the organic unity, which are therefore called "anomalies" or pathological aberrations from the evolutionary trend of the species; (c) transilient deviations or mutations which bring about a new system of correlations, what others have called "a new position of organic equilibrium," and lead to the origin of a new "form" in various degrees removed from the original type.

(2) Prof. Jaekel endeavours to draw a sharper distinction than has hitherto been made out between the origin of a species and the emergence of a new structural "form." The origin of a species is a consequence of some form of reproductive isolation (Kreuzungsausgleich)—of a restriction in inter-crossing, of an alteration in the radius in mutual fertility; but the structural differentiation which leads up to a new "form" is a very different, and it may be much more important matter.

(3) The third, and perhaps the most essentially new contribution which Jaekel makes to the interpretation of structural transformations, is that he does not regard these changes as arising by the summation of the qualities of adult forms, but as due to inhibitions or accelerations of development in the juvenile plastic stages. Each individual ontogeny is a re-creation of the inherited "Stammform," with a plastic period in which new adjustments may arise.

While we have indicated the three most conspicuous ideas in this essay, we have done it scant justice. It expresses the views of an expert palæontologist in regard to the mechanism of evolution, and is full of

originality and suggestiveness. The illustrations in evidence are chiefly drawn from crinoids, brachiopods, and trilobites. We venture to express the hope that the author will expand his essay into a book, in which he may condescend to be a little less terse.

J. A. T.

*Ausgewählte Methoden der analytischen Chemie.* By Prof. Dr. A. Classen and H. Cloeren. Pp. xvi+831. (Brunswick: Vieweg und Sohn, 1903.) Price 20 marks.

THIS is just the kind of book to which an analyst will turn with pleasure. It is well bound, well printed, and really beautifully illustrated. It contains, moreover, a good account of recent methods or improvements in old ones, with the necessary details and manipulative *Kunstgriffe* which in analysis often means the difference between failure and success.

The subjects which are included in the volume are the estimation of the common gases, water analysis, which is fully treated, the analysis of hydrogen peroxide, ozone, explosives, the common compounds of carbon, sulphur, phosphorus, boron and silicon, the cyanides, concluding with a chapter on organic analysis.

It would seem ungenerous to try to discover omissions or to offer criticisms when the authors have given so much, and with such evident care and thoroughness. But the book has one weak point which is common to many books of this class. The authors have not submitted all the methods they describe to personal revision (indeed, it would be difficult to do so without the expenditure of a good deal of labour), but there is no doubt that such a critical examination, which would help the reader to a choice of his method, would greatly add to the value of the volume.

However, the important point for the analyst is that he has in his possession the most recent information from a variety of sources which has been collected and sifted by a discriminating authority on analytical matters.

In looking through the volume it is evident that the analytical work of recent years has lain rather in the perfecting of existing methods than in the discovery of new ones. This seems only natural; for although new technical processes are constantly coming into operation, the number of new reagents does not increase *pari passu*, and it follows, therefore, that the demands made upon rapidity and accuracy in technical analysis have to be met by the skilful adaptation of old processes to new needs.

An interesting illustration of this is Emmerton's new method for estimating phosphorus in iron, described in the appendix to this volume. Phosphorus has always been precipitated as phosphomolybdic acid, and the precipitate either measured or weighed. The drying of a precipitate always means a loss of time. By the new method the precipitate is not dried, but reduced with zinc and sulphuric acid, and the lower oxide of molybdenum which is formed is titrated and estimated with permanganate.

J. B. C

*O'Gorman's Motor Pocket Book.* By Mervyn O'Gorman. Pp. ix+287. (Westminster: Archibald Constable and Co., Ltd., 1904.) Price 7s. 6d. net.

It is not surprising to find that at last a "motor" pocket book has appeared; in fact, it is a wonder such a work has not appeared sooner. Engineers have long had their "Molesworth," and now the motorist can lay claim to his "O'Gorman" when in trouble or in doubt.

This interesting and instructive book is alphabetically arranged, thus rendering easy the finding of any par-

ticular item of information required. Our author has a breezy style of expression which adds largely to the pleasure of reading the book. Take, for instance, his treatment of that all-important worry of the motorist, the "police." Mr. O'Gorman says, "to pass unchallenged at a speed in excess of the legal limit—a thing which is daily accomplished by cabs, hansoms, and even by the London omnibuses on almost every run when the gradients favour them—and by almost every other vehicle everywhere—remember that by sitting upright with a calm face (on a quiet car) you produce no impression of speed except on turning a corner. If you turn a corner without being able to see down the road you are entering at over 20 miles per hour you deserve to be punished. If, however, you stoop forward (this gives the impression that you are withstanding and endeavouring to avoid a high wind pressure), jamb your hat over your eyes, screw up your face, stare intently and anxiously, do a great deal of steering with visible swinging of your body, blow your horn in such a manner as to say 'Get out of my way' frequently, instead of pressing it slowly and peaceably, you will invariably be arrested. I think a couple of good actors could safely wager to be stopped by an otherwise inoffensive constable at a pace of 10 miles per hour, especially if mounted on a machine the teeth of whose gear 'gave tongue' like a siren, after the manner of certain makes, they would as surely be fined."

The above description is quaint but true, as every motorist knows. On the other hand we find admirable descriptions and explanations of the all-important details of car management, design, &c. Our author's treatment of electric ignition is excellent, the accompanying diagrams being particularly clear. On the subject of accumulators we find much useful information, and, generally, the work contains those hundred and one wrinkles the knowledge of which goes to constitute the successful and trustworthy driver of a motor car, and we cordially recommend to all such the possession and careful perusal of this pocket-book.

N. J. L.

*Weather Folk-Lore and Local Weather Signs.* Prepared under the direction of Willis L. Moore, Chief U.S. Weather Bureau, by Edward B. Garriott. Pp. 153. (Washington, U.S.A.: Government Printing Office, 1903.) Price 35 cents.

THIS volume is divided practically into two parts, the first dealing solely with weather folk-lore gathered from many available sources, the second with summaries of local weather signs as based on special reports of observers to the chief of the U.S. Weather Bureau. The latter are arranged alphabetically as regards the names of the towns from which these reports are received, and deal for the most part with the prospect of fair or foul weather as indicated by the appearance of clouds, direction of wind, movements of barometer, &c. In fact, weather-folk-lore, as such, is naturally conspicuous by its absence. This portion of the work will not be of much interest to Britishers, as the signs only hold good for the particular parts of the country in question. The first portion, on the other hand, is of more general interest, as many of the quaint sayings were, so far as can be judged, the results of observation of long experience. The subject is subdivided under several different titles, according as the weather was foreshadowed by wind, barometer, clouds, humidity, temperature, &c., or by the peculiar effects of these on objects animate or inanimate. Many curious sayings, probably unfamiliar to British readers, are here collected, but one, with regard to the effects of atmospheric moisture that precedes rain, is

rather gruesome. "When the locks turn damp in the scalp house surely it will rain" (American Indians).

Reference is also made to the moon as a weather prophet, to many weather proverbs of a miscellaneous kind, and to recent work on possible long-range weather forecasting.

The book concludes with a series of charts which illustrate the local weather signs as observed at regular stations of the Weather Bureau.

W. J. S. L.

*The Principles of Mechanism.* By Herbert A. Garratt. Pp. viii+166. (London: Edward Arnold.) Price 3s. 6d.

IN this book the author has brought together his notes of lectures delivered in connection with a course of instruction in mechanism at the Northern Polytechnic Institute, Holloway. The work is divided into two parts, dealing respectively with the kinematics and the dynamics of machines.

These notes are no doubt valuable to the compiler and useful to the students under his charge, but they seem too fragmentary to be of much service to the general reader. The descriptions of the various mechanisms are concise and to the point, but the mathematical treatment, where given, is often unsatisfactory. Moreover, there is sometimes a want of perception of the relative importance in the several items which have been introduced. Thus in the second chapter, dealing with circular and straight line motion, the fundamental subject of simple harmonic motion is not properly defined, and is dismissed with a meagre treatment extending only over one page, whilst nearly three pages are devoted to the comparatively unimportant problem of finding the crank position which corresponds with the maximum piston velocity in a steam engine, answers being given in degrees, minutes and seconds. Special constructions for velocities and accelerations such as Mohr's and Klein's are given, but these are not well explained, and the reasoning is difficult to follow; the author seems to be unaware of the fact that he is here dealing with vector quantities.

In chapter iii. the treatment of wheel teeth seems unsound. The chapter is somewhat redeemed by descriptions of gearing chains for cycles, and modern machines for cutting worm wheel teeth and bevel wheel teeth. A number of valve gears are described in chapter iv., with some applications of the Zeuner valve diagram.

Part ii. opens inauspiciously, for in the first chapter, which enunciates the general principles that are to guide the student, power and work are confused with one another, and an equation of energy is written down which involves the addition of power and kinetic energy as if they were quantities of like kind. This part includes a casual treatment of speed regulation as affected by fly wheels and governors, one or two problems on balancing, water motors, and friction. Two useful examples of axial flow turbines, with numerical data and good diagrams, are given, the information being supplied to the author by Messrs. Günther and Sons, of Oldham.

*Calculating Scale, a Substitute for the Slide Rule.* By W. Knowles, B.A., B.Sc. Pp. 29. (London: E. and F. N. Spon, Ltd.; New York: Spon and Chamberlain, 1903.) Price 1s. net.

IN this book the author provides and explains the use of two graduated scales, placed adjacent to each other for comparison and fixed together, on one of which numbers can be read off, and on the other the logarithms of the numbers, or *vice versa*. This compound scale is 100 inches long, and is cut up into